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(54) Burner for a gas boiler or the like.

(57) Burner for a gas boiler or the like comprising one elongate burner tube (1) which is provided with a zone extending in the longitudinal direction and having burner openings (2), and which is closed at both ends by an end wall (3,4). The burner tube (1) contains a venturi tube (5), whose inlet mouth (6) projects through the end wall (3) while the outlet end (8) of the venturi tube lies some distance from the other end wall (4). Inside the burner tube a partition (9) has been arranged which extends in the axial direction at least from the outlet end (8) of the venturi tube to the burner tube end wall (4) facing it. The partition (9) is substantially parallel to and at a distance from the wall of the tube and in the region remote of the burner openings (2) provided with an elongate gap (10). The partition (9) is also provided with a deflector (11) which diverts the mixture flowing out of the venturi tube in the direction of the gap (10) in the partition, the mixture flowing further through the passages (12) between the partition (9) and the wall of the burner tube to the burner openings (2).

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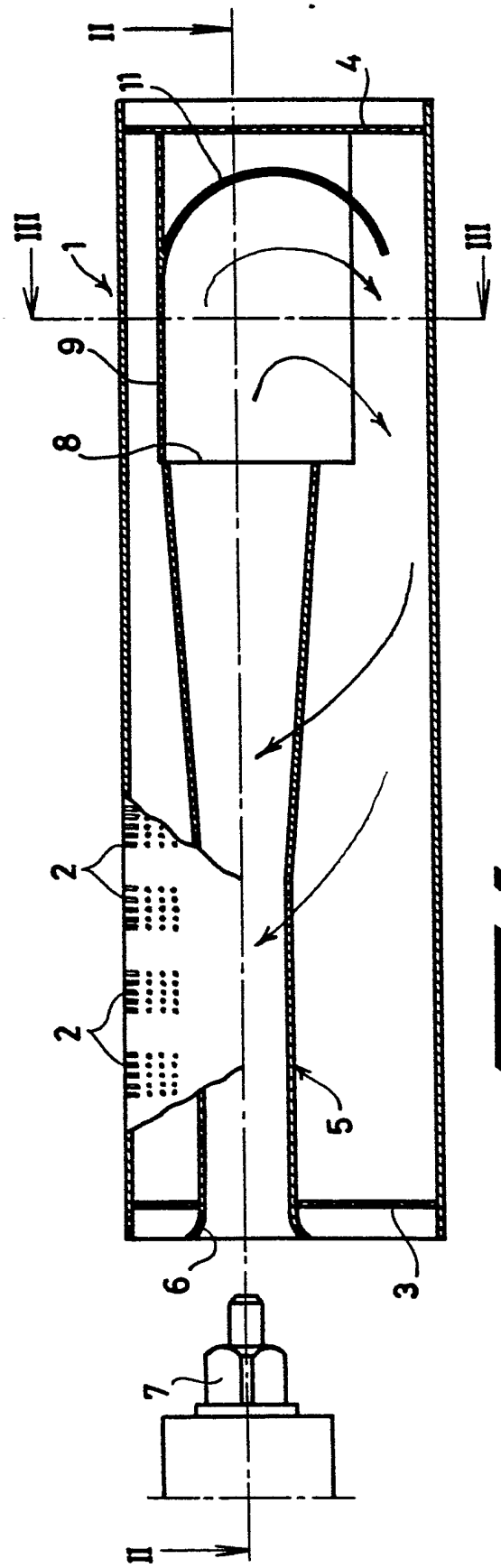

Fig. 2.

Burner for a gas boiler or the like.

The present invention relates to a burner for a gas boiler or the like, comprising at least one elongate burner tube which is provided with a zone extending in the longitudinal direction and having burner openings, and which is closed at both ends by an end wall, said burner tube containing a venturi tube which extends in the axial direction of the tube and whose inlet mouth projects through one end wall and cooperates with a gas injector to draw in air for combustion, while the outlet end of the venturi tube lies some distance from the other end wall of the tube and is provided with a deflector for reversing the direction of flow of the mixture of gas and air.

Various forms of a burner of this type are known, and their object is to ensure over the entire length of the burner tube the most homogenous possible combustion with a short flame without producing a disturbing noise. In practice it has been found that known burners comply with this requirement only to a limited extent. This is the consequence of the fact that the burner tubes have a limited length and that the reversal of the direction of the mixture of gas and air gives rise to turbulence resulting in variations of pressure and speed which do not have sufficient opportunity to be damped.

The present invention seeks to improve these known burners in such a manner that combustion is as uniform as possible over the entire surface of the burner without any disturbing noise being produced.

According to the invention this aim is achieved by the provision inside the burner tube of a partition which lies in the axial direction and extends at least from the outlet end of the venturi tube to the burner tube end wall facing it and which is substantially parallel to and at a distance from the wall of the tube and, in the region remote from the burner openings, is provided with an opening, said partition being provided with a deflector which diverts the gasair mixture flowing out of the venturi tube in the direction of the opening in the partition.

This construction has the advantage that the gas-air mixture is shielded from the burner openings, at least in the region where the reversal of the direction of flow takes place, that is to say the region where the greatest turbulence occurs. Together with the wall of the tube the partition forms two passages through which the gas-air mixture flows to the region of the burner openings. The dimensions of the passages are such that the turbulence of the gas-air mixture is to a great extent damped in them without the resistance of the burner being appreciably increased. Greater resistance of the burner would of course have the consequence that less air would be drawn in by the venturi action (induction), so that the air factor would be reduced and in the end longer flames would be formed.

According to the invention the partition may likewise extend over a part of the venturi tube, and may even extend to the end wall of the burner tube where the inlet mouth of the venturi tube projects to the outside.

In a preferred embodiment of the invention the venturi tube is disposed eccentrically inside the burner tube, in such a manner that the distance between the venturi tube and that region of the burner tube which is provided with the burner openings is shorter than the distance between the venturi tube and the region of the burner tube lying diametrically opposite the first-mentioned region. This construction has the advantage that a larger space is available for the diversion of the gas-air mixture and that less turbulence is produced by this diversion. In addition, the partition can extend further from the burner openings, so that the passages formed by the partition can be longer and the mixture will have more opportunity to come to rest before reaching the burner openings.

The invention will be explained more clearly with reference to the drawings, in which:

Figure 1 is a vertical section of the burner according to the invention;

Figure 2 is a section according to line II-II in Figure 1;

Figure 3 is a section according to line III-III in Figure 1;

Figure 4 is a section corresponding to Figure 3 of another embodimerit of the burner according to the invention, and

Figure 5 is a vertical section corresponding to Figure 1 of another embodiment of the burner.

As can be seen in the drawings, the burner consists of an elongate burner tube 1, which is provided with a region A which extends in the longitudinal direction and has burner openings 2, the tube 1 being closed at each end by respective end walls 3 and 4. The burner tube contains a venturi tube 5 which extends in the direction of the axis of the burner tube and whose inlet mouth 6 extends through the end wall 3 and cooperates with a gas injector 7 to draw in air for combustion. The outlet end 8 of the venturi tube lies some distance from the other end wall 4 of the burner tube 1.

A partition 9 extends in the axial direction from the outlet end 8 of the venturi tube to the end wall 4 of the burner tube 1 facing it. The partition 9 extends some distance from and substantially par-

allel to the wall of the burner tube 1, and its portion remote from the region A provided with the burner openings 2 is provided with an opening which in the examples of embodiment illustrated consists of a single continuous gap 10 (see Figure 3 and 4).

Inside the partition 9 is disposed a deflector 11 which diverts the gas-air mixture flowing out of the venturi tube 5 back over an angle of about 180° in the direction of the gap 10.

As can be seen particularly clearly in Figures 3 and 4, passages 12 are formed between the wall of the burner tube and the partition 9, through which the mixture diverted by the deflector 11 can flow to the burner openings 2 situated in the region A. These passages 12 serve to enable the flow to come to rest and to damp turbulence.

Figures 3 and 4 also show that the burner tube has in cross-section a somewhat elongate shape with a curved top surface in which the region A provided with burner openings is situated. The side walls of the burner tube may be curved (Figure 3) or straight (Figure 4), while the partition 9 is adapted to the shape adopted. The venturi tube 5 is disposed inside the burner tube 1 in such a manner that the distance from the venturi tube to the top surface of the burner tube is shorter than the distance from it to the bottom region of the burner tube lying diametrically opposite. In the lower part of the burner tube additional space is thus provided to enable the air-gas mixture to be diverted over a larger radius, so that less turbulence results. Furthermore, the partition can extend further along the sides of the burner tube 1 in the downward direction, so that the passages 12 becomes longer and their damping action is increased.

Figure 5 shows another form of construction of the burner according to the invention, in which the partition 9 extends from the outlet end 8 of the venturi tube to the end wall 3 of the burner tube. It will be clear that the partition 9 need not necessarily extend to the end wall 3, but may also extend over a part of the venturi tube. It is however important that in all cases the partition should be present in the region where the greatest turbulence occurs.

Various modifications are possible within the scope of the invention; thus, de passages 12 need not have a uniform width, but may for example be convergent or divergent in the direction of the burner openings. The width of the passages, viewed in the lengthwise direction of the burner tube, also need not be constant.

Claims

1. Burner for a gas boiler or the like, comprising at least one elongate burner tube (1) which is provided with a zone (A) extending in the longitudinal direction and having burner openings (2), and which is closed at both ends by an end wall (3,4), said burner tube containing a venturi tube (5) extending in the axial direction of the tube and whose inlet mouth (6) projects through one end wall (3) and cooperates with a gas injector (7) to draw in air for combustion, while the outlet end (8) of the venturi tube lies some distance from the other end wall (4) of the burner tube and is provided with a deflector (11) for reversing the direction of flow of the mixture of gas and air, characterized in that inside the burner tube (1) a partition (9) is provided which extends, in the axial direction, at least from the outlet end (8) of the venturi tube (5) to the burner tube end wall (4) facing it, and which is substantially parallel to and at a distance from the wall of the tube and in the region remote from the burner openings is provided with an opening (10), said partition being provided with a deflector (11) which diverts the gas-air mixture flowing out of the venturi tube in the direction of the opening in the partition.

2. Burner according to Claim 1, characterized in that the partition also extends over a part of the venturi tube (5).

3. Burner according to Claim 1, characterized in that the partition (9) joins together the respective end walls (3,4) of the burner tube.

4. Burner according to one of the preceding claims 1 to 3, characterized in that the opening - (10) in the partition (9) is formed by a single continuous gap.

5. Burner according to one of the preceding claims 1 to 4, characterized in that the partition (9) at least partially adjoins the outlet end (8) of the venturi tube.

6. Burner according to one of the preceding claims 1 to 5, characterized in that the venturi tube (5) is disposed eccentrically inside the burner tube, in such a manner that the distance from the venturi tube to the region (A) of the burner tube which is provided with the burner openings is shorter than the distance to the region of the burner tube lying diametrically opposite.

7. Burner according to one of the preceding claims 1 to 6, characterized in that the burner tube is somewhat elongate in cross-section, with its longer axis extending vertically, while the partition extends substantially along the top region of the burner tube where the burner openings are provided and along the side walls of the burner tube.

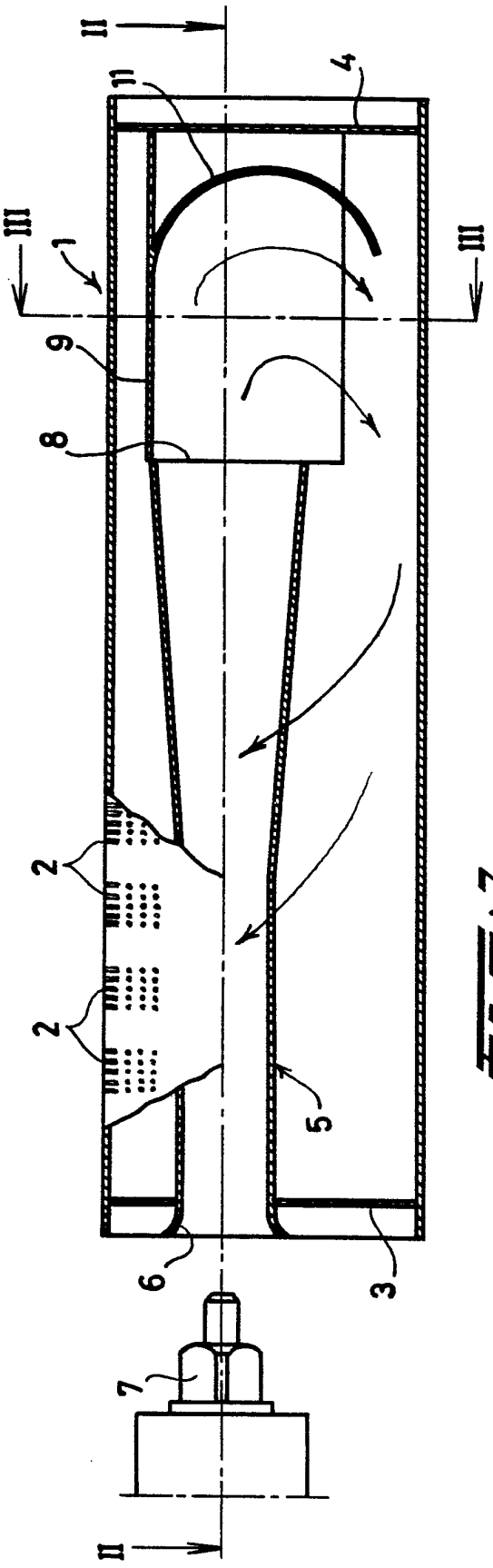

Fig. 1.

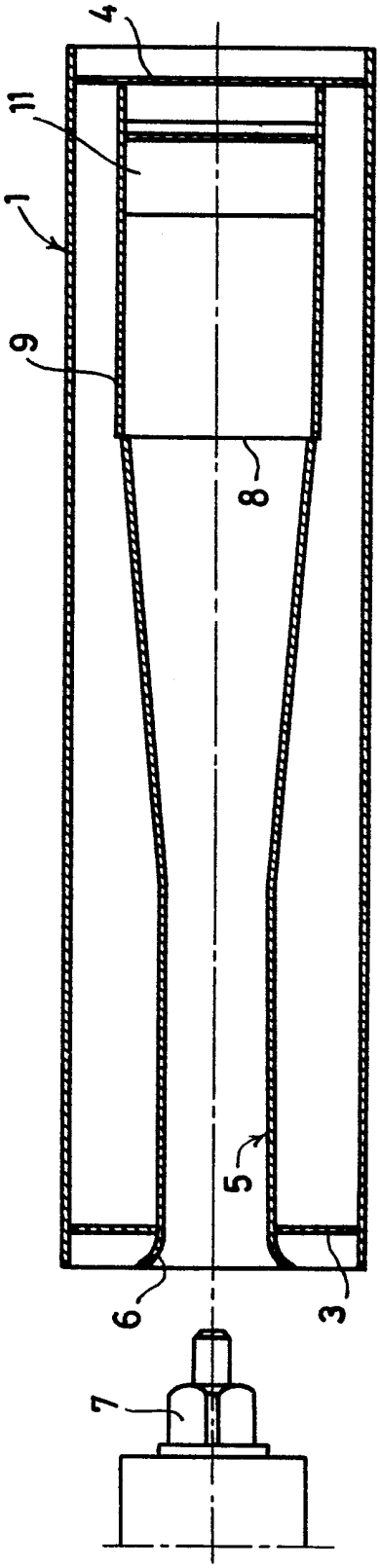

Fig. 2.

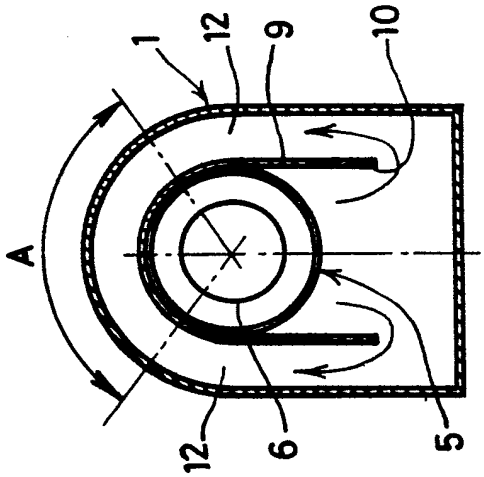

FIG. 4.

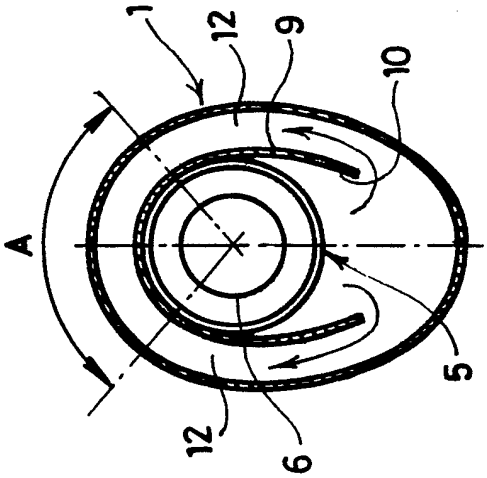

FIG. 3.

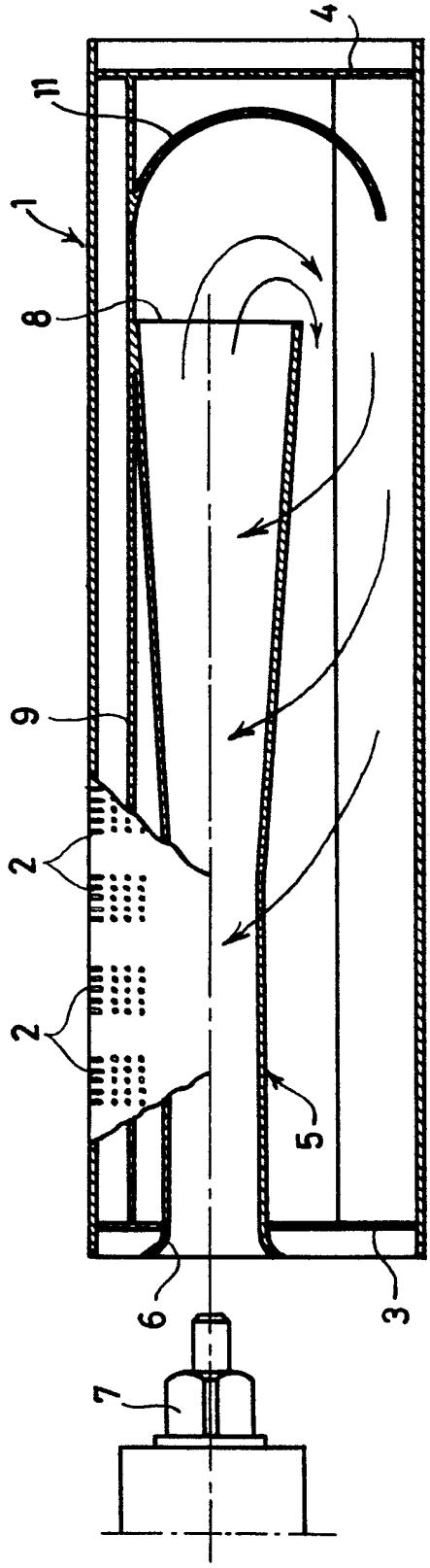

FIG. 5.

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EUROPEAN SEARCH REPORT

Application number

EP 86 20 1665

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	US-A-3 304 986 (ZWAAGSTRA) * Column 3, lines 9-18; figures 1-6 *	1	F 23 D 14/10 F 23 D 14/64
A	AU-B- 11 481 (RADIATION LTD.)(1966) * Page 3, lines 20-27; page 5, lines 2-24; page 9, last paragraph; figures 1,3,9 *	1-3,7	
A	FR-A-1 458 167 (ROBREDO) * Page 3, left-hand column, paragraphs 3,4; figures 1-5 *	1,3	
A	AU-B- 534 415 (McINNES) * Page 8, lines 30-40; figures 1-4 *	6	
A	GB-A- 982 376 (DRAVO) * Page 2, lines 3-23,76-104; figures 1-3 *	5	TECHNICAL FIELDS SEARCHED (Int. Cl.4) F 23 D
A	US-A-1 507 791 (PACKER)		
A	US-A-1 732 071 (SHAW)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	09-01-1987	PHOA Y.E.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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E : earlier patent document, but published on, or after the filing date
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ABSTRACT:

CHG DATE=19990617 STATUS=O> Burner for a gas boiler or the like comprising one elongate burner tube (1) which is provided with a zone

extending in the longitudinal direction and having burner openings (2), and which is closed at both ends by an end wall (3,4). The burner tube (1) contains a venturi tube (5), whose inlet mouth (6) projects through the end wall (3) while the outlet end (8) of the venturi tube lies some distance from the other end wall (4). Inside the burner tube a partition (9) has been arranged which extends in the axial direction at least from the outlet end (8) of the venturi tube to the burner tube end wall (4) facing it. The partition (9) is substantially parallel to and at a distance from the wall of the tube and in the region remote of the burner openings (2) provided with an elongate gap (10). The partition (9) is also provided with a deflector (11) which diverts the mixture flowing out of the venturi tube in the direction of the gap (10) in the partition, the mixture flowing further through the passages (12) between the partition (9) and the wall of the burner tube to the burner openings (2).